

have existed in the age of the Chalk, as shown in the map at the end of the volume. Three corresponding names (*Archiplata*, *Archibrasilia*, and *Archiguania*) are proposed for the ancient bosses from which the whole continent of South America appears to have been developed, and are explained according to the author's views in his essay on the palæogeography of that region.

Three chapters of Dr. von Ihering's volume treat of the geographical distribution of river-mussels, and are also of some importance, as the author is a leading authority on this subject. Written in 1890, they were translated into English and re-published in the *New Zealand Journal of Science*. The fresh-water molluscs of Chili show many points of affinity to those of New Zealand, and the author agrees with Captain Hutton's views that in the Lower Cretaceous period a large Pacific continent must have extended from New Guinea to Chili, and sent out a peninsula to include New Zealand.

Those who are engaged in the study of the difficult problems presented by palæogeography will do well to consult the memoirs collected by the author in the present volume.

The Moon, a Popular Treatise. By Garrett P. Serviss. Pp. xii+248; illustrated. (London: Sidney Appleton, 1908.) Price 6s. net.

In describing the Yerkes photographs of the moon Mr. Serviss has had a pleasant task, and has performed it with pleasing results. The text involves a selenologist, a lady questioner, and the excellent photographs of the moon taken on successive evenings throughout an entire lunation by Mr. Wallace with the 12-inch telescope of the Yerkes Observatory. The author has managed to keep the questions in the background whilst making the answers very lucid and impressive. In an introductory chapter the dialogue turns on the distance, size, motions, &c., of our satellite; thenceforward it takes each photograph of the moon in turn, and gives a simple, straightforward account, in popular language, of the various features, introducing, at well-timed intervals, asides on geometrical, photometrical, and such-like questions. Then follows a chapter (iv) dealing with some of the larger individual features of the lunar surface, as shown on the large-scale photographs taken by Mr. Ritchey with the Yerkes 40-inch refractor.

The exquisite photographs—well reproduced—and the easily readable text of this volume should ensure it a welcome from all classes of readers, whether they be astronomers or not. There are twenty-one photographs in the first series and five of the enlarged portions, besides a number of diagrams in the text.

W. E. R.

The Apodous Holothurians. By H. L. Clark. Smithsonian Contributions to Knowledge. Part of vol. xxxv. Pp. 231. (Washington: Smithsonian Institution, 1907.)

The author of this valuable memoir has had the advantage of studying more than two thousand specimens of the species included in the families Synaptidæ and Molpodadiidæ, and he has taken the opportunity of collecting together in the form of a handsome volume the information we possess concerning all the species of this interesting group. There are three coloured and ten monochrome plates of figures, illustrating the form and anatomy of the different species, of which several are original, and the others copied from the works of Semper, Theel, Sluiter, and other zoologists. Eight new genera are described, and a new generic name is proposed for an old genus. The monograph will undoubtedly be of great service to all those who are interested in the study of the Echinodermata.

LETTERS TO THE EDITOR.

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Elimination of Self-coloured Birds.

STATISTICAL data on the real value of colour markings in the survival of animals in the field are so uncommon that the publication of the following fragment may be excused.

At the Station for Experimental Evolution, about 300 chicks of from five to eight weeks of age on May 10 were running at large on a well-cropped pasture about three acres in area. For the most part, within the space of less than two hours, twenty-four of these were slaughtered by three crows which were caught in the midst of their work of chasing and killing the young poultry. A close estimate of the fowl as they ran at large shows that about 40 per cent. were of a white plumage, 40 per cent. black or nearly so, and 20 per cent. had a pencilled or striped marking more or less like that of the female jungle fowl or ordinary game. The interesting question arose, Was there any elimination on the ground of colour by the crows? Did any colour favour the escape from observation of any of the chicks?

Were there no selective elimination, expectation on the ground of chance is that of the twenty-four killed 9·6 would be white, 9·6 black, and about five pencilled. Actually, there were killed ten whites, thirteen blacks or prevailingly so, and one coarsely mottled grey and buff. No true pencilled bird was killed! The killed birds were largely Leghorns, Minorcas (both good fliers); the pencilled birds were partly games (good fliers), but mostly dark Brahmans (poor fliers). The race is not always to the swift! This fragment, then, so far as it goes, indicates that the self-colours of poultry, which have arisen under domestication, tend to be eliminated by the natural enemies of these birds, and the pencilled birds are relatively immune from attack because relatively inconspicuous.

CHAS. B. DAVENPORT.

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"Barisal Guns" in Western Australia.

IN NATURE of October 31, 1895, Sir George Darwin, in a letter on "barisal guns," "mist puffers," and allied noises, desires all those hearing such to record them from time to time. Recently an instance, which may be of this nature, came under my notice, the only apparent difference being that it was a single noise, and was not repeated several times.

It happened that in July, 1907, I was dispatched by the Government of Western Australia to a remote portion of the north-west of that State to carry out certain investigations. We were camped for two months on the Strelley River (lat. 20° S.)—which only runs in flood-time—sixty miles from Port Hedland, and the same distance from Marble Bar. The situation was a desert "spinifex" plain, with occasional low hillocks of granite boulders, and uninhabited, save by occasional sheep and cattle stations, between the two places mentioned. At approximately 8.35 p.m., mid-West Australian time, on Friday, August 9, I was lying in the tent when, in the words of my diary, "we suddenly heard a dull roar lasting several seconds, increasing in loudness and then decreasing. Everyone heard it and looked round. The sky was quite clear, and there were no signs of thunder clouds. There was no apparent tremor. I thought the noise came from the S.E., others from the N.E. Some suggested it was the rumble of a herd of cattle galloping over a clay pan with hollow ground beneath, as they hear similar noises in the Kimberley District (W. Australia). Mr. G. and I wonder if it is due to a volcanic eruption somewhere, as that of Krakatoa was heard not very far from here." Next day

"some men camped twenty miles west from here inquired if we had heard the rumble last night: it appears their Afghans jumped up and said 'buggy coming.' Whatever the sound was, it was not caused by cattle galloping."

The sound resembled a distant, prolonged peal of thunder or the discharge of a far-away piece of ordnance or mine explosion. The nearest working mines would be about sixty miles away, the sea about fifty miles, and it is needless to say there is no artillery within hundreds of miles. No noticeable meteor was seen by anyone, and had the noise been due to this, would it have been heard at places twenty miles apart? It might have been due to an earthquake, but no tremor was noticed.

I have heard from ear-witnesses of dull sounds resembling this being heard in the Kimberley district of this State. At the time, a black-fellow said, "Hill tumble down," and next day they found that great masses of rock had fallen. This might, perhaps, be accounted for in part by the unequal temperatures between day and night—the day very hot, the nights very cool. Though the days in August were hot (about 90° F. in the shade) and the nights very cool (requiring several blankets in the early morning), the nearest hill to us was four miles at least away to the east.

Was this, then, an instance of the phenomenon known as "barisal guns" on the Brahmaputra and "mist pouffers" off Belgium?

Mr. W. E. Cooke, the Government astronomer, to whom I forwarded an account of the phenomenon with the above inquiry, advised me to record it according to the wish of Sir George Darwin.

J. BURTON CLELAND.

Department of Public Health, Perth,
W. Australia, April 16.

Welsh Saints and Astronomy.

THERE were in Anglesey two contemporary saints who were in the habit of meeting together at a spot mid-way between their respective abodes. One was called Seiriol Wyn, "Seiriol the White or Bright," the epithet signifying his coming from the east, the region of sunrise. He had his abode on Puffin Island, on the extreme east of Anglesey. The other saint was called Cybi, and because he travelled to meet his friend from the west he was called Cybi Velyn, "Cybi the Yellow." He lived on Holy Island, at Caer Gybi, "Cybi's Camp," the Welsh name of Holyhead. Their place of meeting was in the parish of Llandyvrydog, where there are two springs called Ffynnon Cybi and Ffynnon Seiriol, which are referred to by Matthew Arnold.

"In the bare midst of Anglesey they show
Two springs which close by one another play,
And 'thirteen hundred years ago,' they say,
'Two saints met often where these waters flow.'

Cybi, known in Cornish literature as Kebie, seems to have reached Wales from Cornwall. His wanderings and settlements are curiously coincident with the distribution of the cromlech areas in Wales. On further inquiry one finds that Cybi and Seiriol were regarded as astronomers, and that their places or settlements in Wales may be regarded as observatories.

In an ancient poem, to an extract from which I find the reference "Archaiol. vol. ii. p. 38," they are numbered among the "seven cousin saints," the others being Dewi, Beuno, Dingat, Cynvarch, and Deiniol. "Those are the seven . . . who have been in (or who entered) the Stone (of round form? 'graen grynder'), and the seven who numbered the stars." The expression "a fu'n y Maen," "who have been in the Stone," must be taken in the sense that they had entered a stone chamber or circle, and it is hard to find any meaning to the phrase unless a cromlech or stone circle is meant, especially when read in connection with numbering the stars. Thus it may fairly be taken that the leading saint-astronomers of Wales are spoken of as having made an astronomical use of stone monuments. This inference is confirmed by the fact that the Cybi churches in Wales, and most likely churches associated with the names of the other six saint-astronomers, preserve in their relation to adjoining churches the cromlech astronomy, especially the May-November year.

JOHN GRIFFITH.

Meteors from κ Draconis in May.

ON May 31, 10h. 40m., I saw amid the gathering clouds nearly overhead a very short third-magnitude meteor close to its radiant at $193^{\circ} + 74^{\circ}$. I had never previously remarked any indication of this shower at the end of May or in June, though it seems continued in an intermittent manner from July to December, and on January 19, 1887, I recorded four meteors from $191^{\circ} + 72^{\circ}$. There is another winter shower near, viz., at $194^{\circ} + 67^{\circ}$, from which I saw seventeen meteors on December 18-28, 1886.

A bright, doubly observed meteor seen in 1893 by Corder and myself had a radiant at $186^{\circ} + 74^{\circ}$. This shower is one of the most interesting of those in the circumpolar region. It is, unfortunately, omitted in the diagram of Ursid radiants facing p. 292 in the Gen. Cat. Radiants, vol. liii. of the Memoirs.

The straggling constellation Draco contains many showers, and some of these are visible over long periods. Thus meteors continue to fall from a centre at about $261^{\circ} + 63^{\circ}$ during the whole year.

Bristol, June 1.

W. F. DENNING.

FORMATION OF GROUND- OR ANCHOR-ICE, AND OTHER NATURAL ICE.

THE formation of ice on the bottom of a river or stream has occasioned much comment and often scepticism in the minds of scientific men. Instead of ice forming on the surface of the water and growing downwards, we find, in circumstances now well understood, ice forming on the bottom and growing upwards. The phenomenon has been observed in all countries where ice is formed, and has been given various names. In Europe it is called ground-ice or bottom-ice (*glace-du-fond, grund-eis*), but we often find local names, such as ground-gru and lappered-ice. The term anchor-ice evidently originated in America, for the first record of its use seems to be by a writer in the "Encyclopædia Americana," published in 1831. The term is universally used in the United States and in Canada.

There are many early records of the appearance of ground-ice. It was seen by Hales in 1730 in the Thames. Ireland, in his "Picturesque Views" of the Thames, published in 1792, speaks of ground-ice, remarking, "the watermen frequently meet the ice meers or cakes of ice in their rise, and sometimes in the underside enclosing stones and gravel brought up by them ad imo." It was observed in the Elbe as early as 1788, in the Rhine at Strassburg in 1829, and in the Seine, by Arago, in 1830. So much interested was Arago in the ice that, for the benefit of the doubting savants of his time, he published in France, and in the *Edinburgh New Philosophical Journal* for 1833, an account of his observations. Other interesting papers on the same topic were published about that time. In the same Edinburgh journal we find, in 1834, a paper by the Rev. Mr. Eisdale. Two very interesting and instructive papers were published in the *Phil. Trans.* for 1835 and 1841 by the Rev. James Farquharson, F.R.S., of Alford, of his observations on the Don and the Leochal.

In Canada the formation of anchor-ice has been given much study, largely owing to its great abundance and economic aspect. For the same reason, much attention has been devoted to it in Russia by prominent engineers, notably by M. Leon Vladimirof in his study of the ice conditions in the Neva.

Nowhere can be witnessed a more wonderful sight of the delicate poising of the forces of nature than in a river like the St. Lawrence, with the advent of the winter season. In November, when the temperature of the water arrives at or near the freezing point, the manufacture of ice begins, and for a period of nearly